REV-01
BSC/01/05

2025/06

SET A

B.Sc. CHEMISTRY
FOURTH SEMESTER
INORGANIC CHEMISTRY III
BSC – 942 IDMN [REPEAT]
[USE OMR FOR OBJECTIVE PART]

Duration: 1:30 hrs. **Full Marks: 35**

Objective

Time: 15 mins. **Marks: 10**

Choose the correct answer from the following: ***1×10=10***

1. NO^+ is isoelectronic with
   a. O_2 b. CO
   c. CO_2 d. O_3

2. $Fe(CO)_5$ has a
   a. Tetrahedral geometry b. Square planer geometry
   c. Trigonal bipyramidal geometry d. Octahedral geometry

3. $Ni(CO)_4$ is an organometallic compound because it has
   a. Ionic bond b. Covalent bond
   c. Ni–C bond d. van der Waal's forces

4. Hapticity refers to
   a. The number of carbon atoms of the ligand that bind to the metal. b. The number of hydrogen atoms of the ligand that bind to the metal
   c. The number of oxygen atoms that bind to the metal d. The number of nitrogen atoms that bind to the metal

5. Which of the following is an organometallic compound
   a. $B(CH_3)_3$ b. $B(OCH_3)_3$
   c. $B(SCH_3)_3$ d. $BN(CH_3)_3$

6. The highest oxidation state shown by Cr is
   a. +2 b. +6
   c. +3 d. +4

7. The magnetic moment of Fe^{2+} is
   a. 3.5 b. 4.9
   c. 6.7 d. 1

8. Wielding glasses contains
   a. Nd_2O_3 and Pr_2O_3 b. Nd_2O_3 and $Ce_4(NO_3)_2$
   c. $Nd_2(NO)_3$ d. Gd_2O_3

9. Percentage of 'mish metal' in Mg alloys is
   a. 27 b. 50
   c. 15 d. 30

10. The color of Ce^{+3} ion in aqueous solution is

a. Green
b. Pink
c. Colorless
d. Red

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Descriptive

Time : 1 hr. 15 mins. **Marks: 25**

[Answer question no.1 & any two (2) from the rest]

1. a. How $Re_2(CO)_{10}$ is prepared by reductive carbonylation? 2+3= 5

   b. How f-f transitions differ from d-d transitions? Give three reasons.

2. a. Give a brief account of the coordination compounds of nitrosyl with metals. 4+4+2=10

   b. Draw the structure of $Ni(CO)_4$. How was it established?

   c. What is synergetic bond?Explain with suitable example.

3. a. "In metal carbonyl nitrosyls, the NO^+ ions are more firmly attached than the CO group." Briefly justify the statement. 3+2+2+3 =10

   b. How $Fe(CO)_5$ is prepared from $Fe_2(CO)_9$ and vice-versa?

   c. Why Ce^{4+} show orange red color?Write the characteristics of this transitions.

   d. Why transition metals show catalytic property? Write the catalysts composition used for Contact process and hydrogenation reaction.

4. a. Give a brief account of the coordination compounds of nitrosyl with metals. 5+2+1+2 =10

   b. Why transition metals tend to form complex?

c. Write electronic configuration and magnetic moment of Ni^{2+} ion.

d. What is the importance of Haber's process? Explain.

5. a. Explain the process of separation of lanthanide elements using ion exchange method. **3+2+2+3 =10**

b. Write two consequences of Lanthanide contraction.

c. What are "mish metals"? Give example.

d. Why transition metals show colour? Give three reasons.

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